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- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

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(54) Title: **PRESSURE MAP BASED FINGERPRINT AUTHENTICATION METHOD AND SYSTEM**

(57) Abstract: A fingerprint system (80) implements a fingerprint authentication method (20, 60) for a user fingerprint image (UFI) based on a plurality of control fingerprint images (CFI). The method involves a transformation of each control fingerprint image (CFI) into a transformed control fingerprint image (TCFI) as a function of a pressure map (PM) associated with the user fingerprint image (UFI), a matching of each transformed control fingerprint image (TCFI) to the user fingerprint image (UFI), and an authentication of the transformed control fingerprint image (TCFI) having a best match with the user fingerprint image (UFI) as an identified fingerprint image (IFI).



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G06K9/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JAIN A K ET AL: "An identity-authentication system using fingerprints" PROCEEDINGS OF THE IEEE, IEEE. NEW YORK, US, vol. 85, no. 9, September 1997 (1997-09), pages 1365-1388, XP002261867 ISSN: 0018-9219 cited in the application page 1369 - page 1373 page 1378 - page 1379 ----- -/-	1-21



Further documents are listed in the continuation of box O.



Patent family members are listed in annex.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ANIL JAIN ET AL: "Fingerprint matching using minutiae and texture features" PROCEEDINGS 2001 INTERNATIONAL CONFERENCE ON IMAGE PROCESSING. ICIP 2001. THESSALONIKI, GREECE, OCT. 7 - 10, 2001, INTERNATIONAL CONFERENCE ON IMAGE PROCESSING, NEW YORK, NY : IEEE, US, vol. VOL. 1 OF 3. CONF. 8, 7 October 2001 (2001-10-07), pages 282-285, XP010563338 ISBN: 0-7803-6725-1 Section 2. Background, last paragraph Section 3.1 Image Alignment Section 3.4 Matching	1-21
X	BOVIK, AL (EDITOR); JAIN, ANIL K. (AUTHOR): "Handbook of Image and Video Processing, Section 10.5 Fingerprint Classification and Matching" 2000, ACADEMIC PRESS, SAN DIEGO, US 275840, XP002328913 ISBN: 0-12-119790-5 cited in the application pages 825-826 pages 831-833	1-21
X	US 6 185 318 B1 (JAIN ANIL K ET AL) 6 February 2001 (2001-02-06) cited in the application abstract; figures 6,7,9,17	1-21
A	SHIGEMATSU S ET AL: "A SINGLE-CHIP FINGERPRINT SENSOR AND IDENTIFIER" IEEE JOURNAL OF SOLID-STATE CIRCUITS, IEEE INC. NEW YORK, US, vol. 34, no. 12, December 1999 (1999-12), pages 1852-1859, XP001149326 ISSN: 0018-9200 Section II.C. Fingerprint Identification Section III. Identifying Pixel abstract	1-21
A	US 6 578 436 B1 (GANAPATHI SRINAVASAN K ET AL) 17 June 2003 (2003-06-17) cited in the application abstract	1,10,13

INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6185318	B1	06-02-2001	US 6263091 B1	17-07-2001
			US 6049621 A	11-04-2000
			US 6314197 B1	06-11-2001
			US 6289112 B1	11-09-2001
			US 6487306 B1	26-11-2002

US 6578436	B1	17-06-2003	AU 6166101 A	26-11-2001
			TW 525097 B	21-03-2003
			WO 0188837 A1	22-11-2001
			US 2002121145 A1	05-09-2002
			US 2002166388 A1	14-11-2002
